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ABSTRACT

Seventy-two sixth graders, stratified on the basis of sex and two levels of IQ (high and low) were randomly assigned to one of three treatment groups: (1) Group I (success only); (2) Group II (failure only); and (3) Group III (success and failure). These subjects (Ss) were used to investigate the effects of verbally controlled success and failure conditions on three aspects of learning behavior: (1) the level of Ss' performance during conditioning; (2) the number of times each S voluntarily performed the task after training; and (3) the level of Ss' performance following training where they are required to participate in the tasks. Results tend to support the hypothesis that a combination of verbal rewards and failures cause Ss to persist longer in involvement on similar tasks following the termination of verbal conditioning procedures. Female Ss' performance was found not to be differentially affected by the various treatments or as a function of IQ while male Ss' performance was so affected. (TL)

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THE EFFECTS OF VERBALLY CONTROLLED SUCCESS AND FAILURE CONDITIONS OF PERSISTENT BEHAVIOR

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The effects of verbal success and failure conditions on learner performance in a meaningful learning task have been the subject of a number of investigations. Many of the investigations have been concerned with determining the effects of conditioning procedures on the acquisition of meaningful learning materials (Buchwald, 1959; Buss & Buss, 1956). In most of these investigations the results would seem to indicate that a combination of a verbal reward and punishment condition is more effective than the exclusive use of reward or punishment conditions.

A related question is concerned with the effects of verbal reward and failure (punishment) conditions on the persistence behavior of the learner, i.e., the number of times a S voluntarily performs the task after conditioning. A relatively small number of investigators have addressed themselves to this question. Of those who have (Grosslight & Child, 1947; Holmes & Moore, 1969), their findings tend to be consistent with the findings of those who have investigated the problem of the acquisition of meaningful learning materials. Specifically, a learning condition which combines verbal reward and failure appears to be more effective in increasing the persistence behavior of learners than either reward or failure conditions.

An interesting question and one which has not been investigated

CG 006 354

widely is: What are the effects of verbal reward and failure conditions on the level of Ss' performance following training under conditions where the Ss are required to participate in a learning task?

This question along with a reconsideration of the question of the effects of verbal reward and failure conditions on a) the acquisition of meaningful learning task and b) learner persistence behavior represents the primary objective of the present investigation. Specifically, the present experiment was designed to investigate the effects of verbally controlled success and failure conditions on three aspects of learner behavior: 1) the level of Ss' performance during training (conditioning of persistence, Pc), 2) the number of times each S voluntarily performs the task after training (persistence, P), and 3) the level of Ss' performance following training where the Ss are required to participate in the tasks (persistence of attention, Pa).

Method

Subjects.--The Ss were 72 sixth-graders, stratified on the basis of sex and two levels of IQ (high and low), and randomly assigned to one of three treatment groups: Group I (Success only), Group II (Failure only), and Group III (Success and Failure).

Materials.--Fifty lists of anagrams, twenty items in length, were constructed using words randomly selected from second and third grade word lists.[1] Four lists were presented on each of five training days. The remaining thirty lists were used to measure persistence and persistence of attention. The anagram task was selected because it allowed control of the administration of particular types of reinforcement while still permitting measures of actual performance.

Treatment.--Success and failure were defined in terms of verbal comments administered by E after the completion of each anagram list. Success consisted of comments such as: "You are doing better than most people who try this." and "You are doing very well." Failure consisted of comments such as: "You are not doing as well as most people who try this." and "You are not doing well at all."

The Ss in Group I were given verbal success without regard for their actual performance, after the completion of each task during the training period. Similarly, Ss in Group II were given verbal failure regardless of their actual performance after each training task. The Ss in Group III were provided success on a random half of the anagram lists and failure on the other half, again without regard for their actual performance.

The E met individually with each S for approximately 15 minutes on each of 5 training days. Each S was given 2 minutes to unscramble as many words on each list as possible. At the end of each list E administered the appropriate reinforcement. Conditioning of persistence was measured in terms of the number of anagram solutions on each training day.

Immediately following training on the fifth day, the remaining two persistence measures were taken. The Ss in each of the three experimental groups were randomly assigned to one of two groups: a) persistence or b) persistence of attention. The Ss in the first group were told that their work was finished but that if they would like to try more lists they could. The E administered no verbal comments and recorded the number of additional lists each S attempted as a measure of persistence. The Ss in the second group were required to attempt ten additional lists. The E again withheld verbal comments and recorded the number of anagram solutions on each list as a measure of persistence of attention.

Results

Three ANOVA's were completed to test the hypothesis involving the effects of the three experimental conditions on a) the total number of anagram solutions on the twenty lists presented during training (conditioning of persistence), b) the number of lists attempted under extinction conditions following training (persistence) and c) the total number of anagram solutions on the ten required lists presented, under extinction conditions, following training (persistence of attention).

The F-ratios and mean squares of the first analysis, comparing the total number of anagram solutions completed during training, are presented in Table 1.

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Insert Table 1 about here
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The means for the various treatment groups are presented in Table 2.

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As can be observed in Table 1, significant F-ratios were obtained for the sex and IQ variables ($p<.001$). An inspection of the means of the respective groups indicates that female Ss solved more anagrams than male Ss and high IQ Ss solved more anagrams than low IQ Ss. Further, a significant F-value was obtained for the sex x IQ x treatment interaction ($p<.05$). Figure 1 is a graphical representation of the interaction of sex, IQ and treatment in terms of the Pc variable.

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A Newman-Keuls analysis of the significant interaction between treatment, sex and IQ indicated that there was a significant difference between the mean number of anagram solutions completed by high IQ male Ss under success conditions, and the mean number of anagram solutions completed under failure or the success-failure conditions ($p<.01$). The mean for the high IQ success group was greater than either of the other two means. Low IQ male Ss' performance under failure conditions was significantly different from low IQ male Ss' performance in either the success or success-failure treatment groups ($p<.01$). In this case

the performance of Ss under failure conditions was greater.

High IQ female Ss' performance did not differ as a function of treatment, nor was there a difference in low IQ female Ss' performance. However, high IQ female Ss in the failure group did solve a significantly different number of anagrams than did low IQ female Ss regardless of treatment ($p<.01$), with high IQ females solving the larger number. High IQ female Ss in the success-failure group tended to perform better than low IQ female Ss. However, these differences were significant only in the case of the low IQ female Ss in the failure group ($p<.01$). No significant differences in performances were observed between high IQ female Ss under the success condition and low IQ female Ss in any treatment. High IQ male Ss' performance under success conditions differed significantly from all low IQ female Ss' performance ($p<.01$). In this case the performance of the high IQ males was greater. No other significant differences between high IQ male and low IQ female Ss were observed.

High IQ female Ss' performance under the success-failure and the failure conditions differed significantly from high IQ male Ss' performance for the same respective treatment groups ($p<.01$) with performance of the females being greater in both comparisons. High IQ female Ss' performance under success conditions did not differ significantly from high IQ male Ss' performance on any condition.

There was a significant difference in performance of female Ss, without regard for treatment or IQ level, from low IQ male Ss performance in both the success and success-failure treatment groups ($p<.01$). In all comparisons the females' performance was greater. Comparison of the performance of high IQ female with the performance

of the low IQ male failure group yielded significant differences between the respective success-failure and failure groups of the high IQ females ($p<.01$), but did not differ significantly from the performance of high IQ females in the success group. In the comparisons where the differences were observed, the high IQ females' performance was greater.

The second analysis measured the effects of training on persistence by the number of lists attempted under extinction conditions. Significant treatment differences were obtained ($p<.10$). A Newman-Keuls test indicated that the number of lists attempted by the success-failure group and the failure group differed with the number of lists attempted by the success-failure group being greater. The number of lists attempted by the success group did not differ significantly from the other two groups, although in number attempted it was near the midpoint between the respective groups. The results of this analysis and the mean number of lists attempted by each treatment appears in Tables 3 and 4 respectively.

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Insert Table 3 about here
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In the last analysis, the number of anagram solutions on the ten required lists presented under extinction conditions was compared. Significant differences in performance as a function of IQ and treatment were observed. An inspection of the means indicated that high IQ Ss completed a greater mean number of anagrams correctly than did low IQ Ss. A Newman-Keuls analysis indicated that the mean number of

anagram solutions completed by the failure treatment group differed significantly from the mean number completed by the Ss in the success treatment group ($p<.05$). Of interest was the observation that the number completed by the failure group was greater than the number completed by the success group. Although the success-failure group solved an intermediate number of anagrams in comparison to the other two groups, the number completed did not differ significantly from the other treatment groups. A comparison of low IQ male Ss' performance with a) high IQ male performance and b) female (both high and low IQ) performance resulted in significant differences ($p<.05$).

The low IQ males solved a smaller number of anagrams than any of the other groups. These data are presented in Tables 5 and 6.

Insert Table 5 about here

Insert Table 6 about here

Using a Least Squares Analysis, the slopes of the lines of best fit for the mean number of solution for the success, failure, and success-failure groups were calculated. Figure 2 presents the lines of best fit for the experimental treatment group.

Insert Figure 2 about here

Discussion

The significant ($p<.05$) sex, IQ, and treatment interaction obtained, in terms of the number of anagrams solved during training suggests, particularly for males, that any broad generalization concerning

the effects of types of verbal reward or punishment on performance must be given careful consideration. Specifically, high IQ males performed best under success conditions, while low IQ males performed best under failure conditions. Treatment differences, on the other hand, did not affect females of either high or low IQ.

One possible explanation for this observation is that the observed interaction reflects past experience of the Ss with the systems of success and failure operating in school and in the homes. Males may receive both greater rewards and harsher punishment than females and thus may be more susceptible to present treatment differences. In addition, low IQ males most likely have experienced failure more frequently than high IQ males and so perform better under those conditions, while high IQ males, more used to success experiences, perform better under conditions of success.

These findings are only partially consistent with the findings of Buchwald (1959) and Buss and Buss (1956). In these investigations it was found that the combination of a reward and punishment condition was more effective for maximizing the conditions for meaningful learning than reward or punishment conditions.

The finding that learning experiences which combine success and failure increased Ss' voluntary test involvement more than learning experiences under failure conditions is consistent with the findings of the earlier Holmes and Moore investigation (1969) and Grosslight and Child (1947).

One of the more interesting observations and one not consistent with the original predictions, was that Ss who were trained under

perceived failure conditions performed at a higher level (Significant $p<.01$) on the required lists after training than the success group.

Further, it was observed that Ss who had experienced failure performed at a relatively constant level on each of the ten lists after training, while Ss experiencing success and failure tended to solve fewer anagrams as the number of lists increased after training.

One explanation for these observations is that the failure condition during training may have acquired the character of a negative reinforcer. Thus by its removal following training, the Ss in this group may have been in fact reinforced, resulting in a corresponding increase in performance. Conversely, in the success and success-failure groups, the removal of the reinforcer following training would result in the predicted decrement in performance.

Another explanation is that avoidance of failure may be a stronger motivation for Ss than obtaining success. Applying this explanation to the data it would follow that one might expect the Ss trained under failure conditions tend to avoid the task when given a choice and if required to participate, seek to avoid failure in the task by solving the greatest number of anagrams possible.

In summary, the results of the present experiments tend to support the hypothesis that a combination of verbal rewards and failures tend to cause Ss to persist longer in involvement on similar tasks following the termination of verbal conditioning procedures. Support was not obtained for the hypothesis that Ss who had been trained under conditions where a combination of verbal rewards and failure would perform at a higher level on such tasks in which their involvement was required and

no form of verbal reward of failure was given. Rather, it was observed that Ss trained under verbal failure conditions performed at the highest level under these conditions. Finally, the analysis of the results of the treatment effects on performance during training suggests that female Ss' performance is not differentially affected by the various treatments or as a function of treatment of IQ while male Ss' performance is affected.

Footnote

[1]Words were selected from the following sources: Benthul, Herman, et al. Spell Correctly. (2) (Morristown, New Jersey: Silver Burdett Co., 1968). O'Donnell, Mabel. Harper Row Basic Speller 3. New York: Harper & Row, 1965.

TABLE 1

Summary of the Analysis of Variance of the Total Number of Anagram Solutions during Training (Pc)

TABLE 1

Source	df	MS	F
A (sex	1	8,955.68	11.78***
B (IQ)	1	16,653.10	21.91***
C (treatment)	2	93.18	0.12
AB	1	1,521.68	2.00
AC	2	871.18	1.14
BC	2	467.79	0.61
ABC	2	2,964.18	3.90*
error	60	759.14	

***p<.001

*p<.05

TABLE 2

Mean Number of Anagram Solutions during Training with the Three-way Interaction Effect of Sex, IQ, and Treatment (Pc)

TABLE 2

	Males		Females		
Treatment	Hi IQ	Lo IQ	Hi IQ	Lo IQ	Total
Success	9.46	5.98	8.45	7.90	7.95
Failure	7.61	7.18	9.56	7.66	8.01
Success-failure	8.00	5.48	9.02	8.26	7.82

FIGURE 1

Graphical Representation of the Interaction of Sex, IQ, and Treatment in Terms of Conditioning of Persistence

FIGURE 1

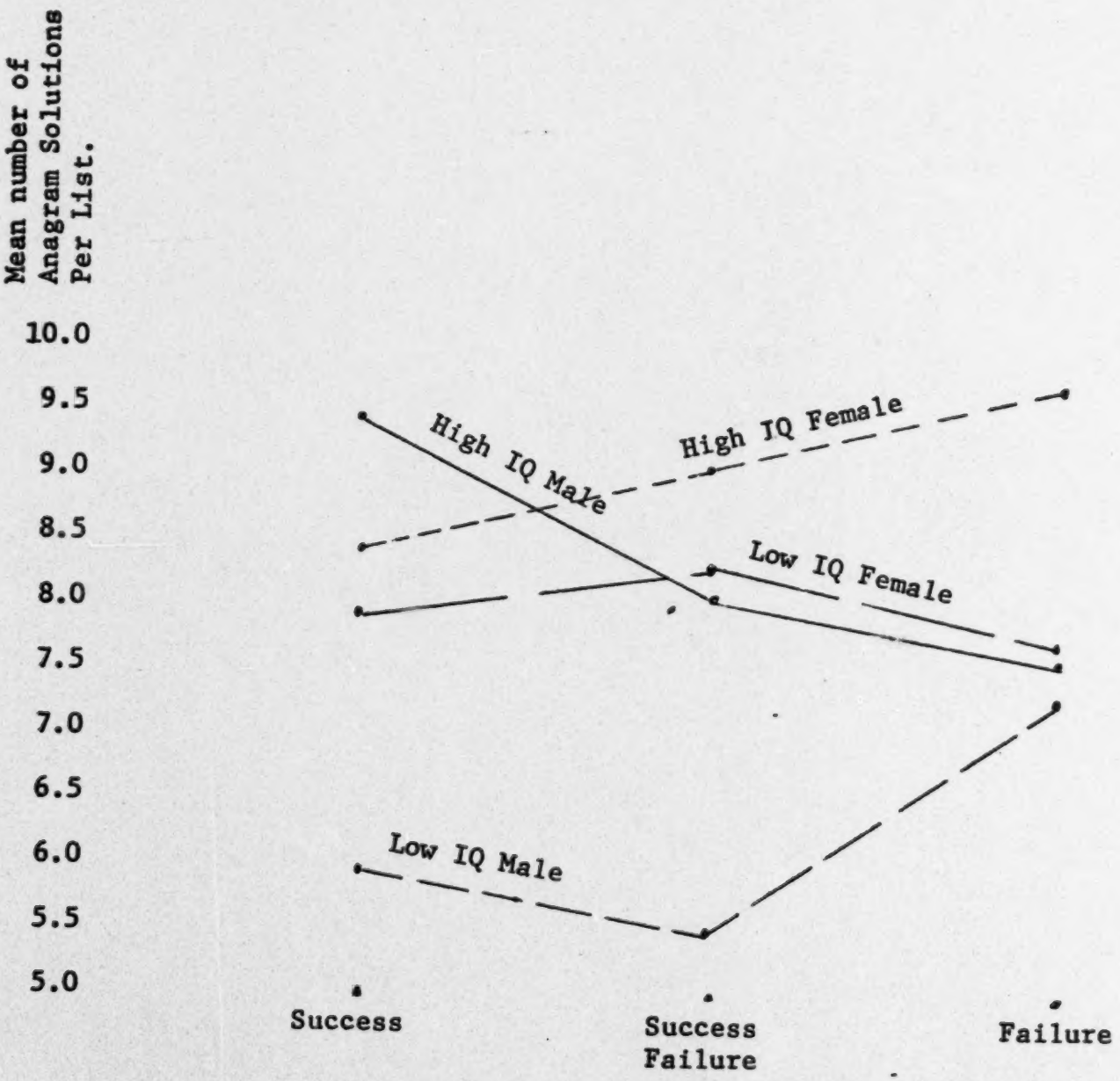

Mean number of Anagram Solutions Per List.
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
High IQ Male
High IQ Female
Low IQ Female
Low IQ Male
Success
Success Failure
Failure

TABLE 3

Summary of the Analysis of Variance of the Mean Number of Lists Attempted under Extinction Conditions (P)

TABLE 3

Source	df	MS	F
A (sex)	1	5.44	0.08
B (IQ)	1	160.44	2.38
C (treatment)	2	175.53	2.53
AB	1	152.11	2.25
AC	2	.53	0.01
BC	2	119.53	1.77
ABC	2	40.19	0.59
error	24	67.53	

TABLE 4

Mean Number of Anagram Lists Attempted per Treatment Group under Extinction Conditions (P)

TABLE 4

Success	Failure	Success-failure
7.67	3.25	10.25

TABLE 5

Summary of the Analysis of Variance of the Number of Anagram Solutions Under Extinction Conditions (Pa)

TABLE 5

Source	df	MS	F
A (sex)	1	164.69	0.65
B (IQ)	1	2,193.36	8.78**
C (treatment)	2	961.19	3.85*
AB	1	1,332.25	5.33*
AC	2	310.86	1.24
BC	2	288.86	1.16
ABC	2	829.03	3.32
error	24	249.86	

**$p<.01$

*$p<.05$

TABLE 6

Mean Number of Anagram Solutions Per List

TABLE 6

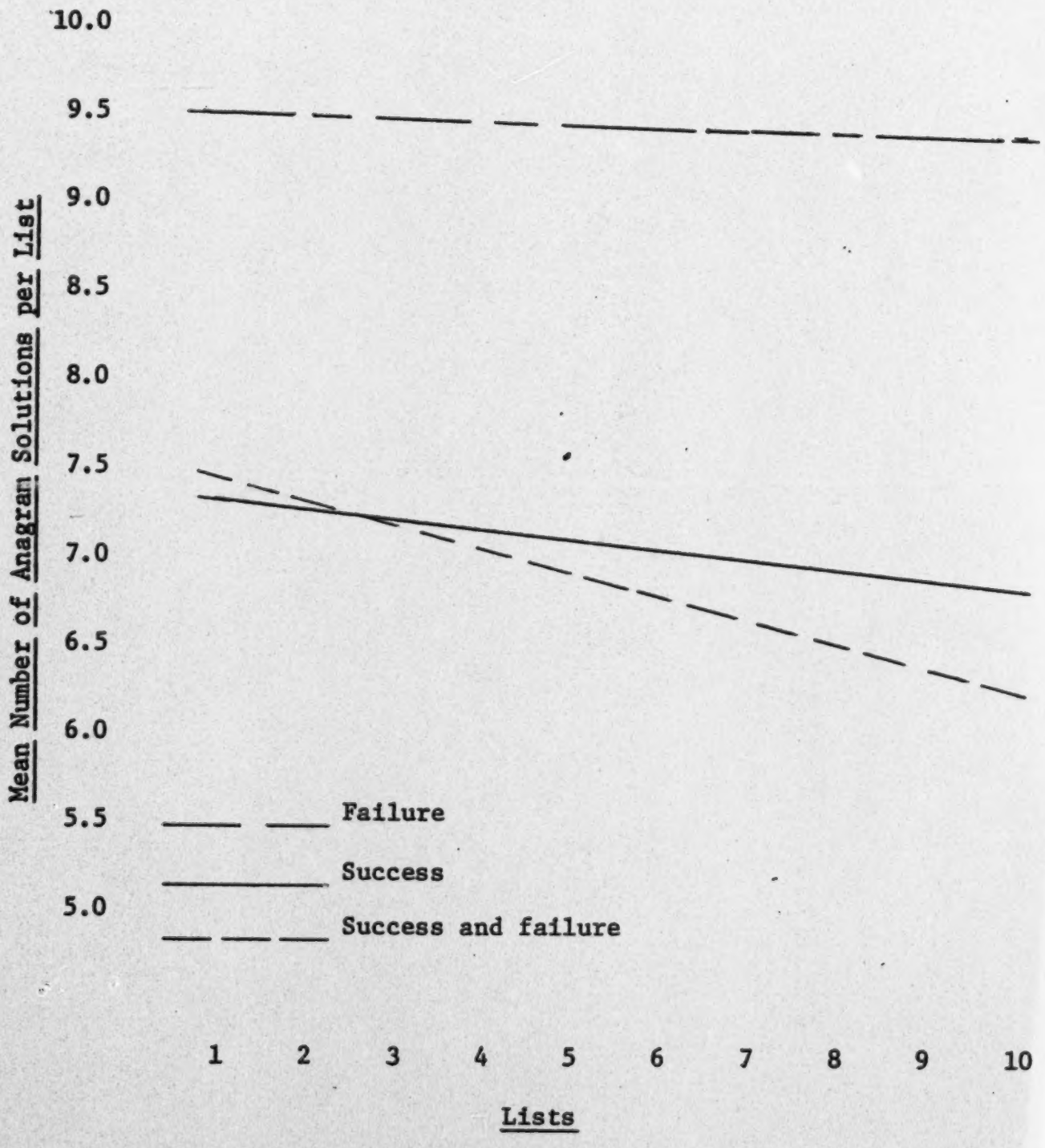
Success	Failure	Success-failure
7.90	8.66	9.69

FIGURE 2

Slopes of the Lines of Best Fit for the

Mean Number of Solutions for the Respective Experimental Groups

FIGURE 2


Mean Number of Anagram Solutions per List
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
Failure
Success
Success and failure
1
2
3
4
5
6
7
8
9
10
Lists

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